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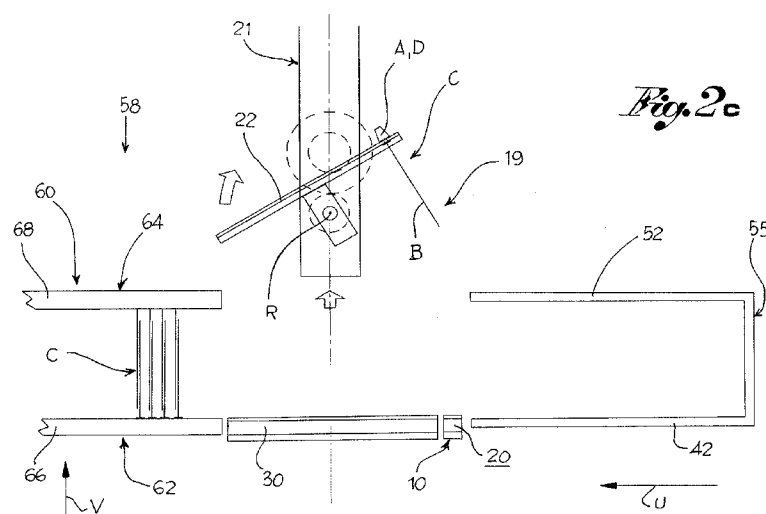
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(54) Title: DEVICE AND METHOD FOR PACKAGING OF THIN BODY CONTAINERS, AND LOADING GROUP OF SAID COTAINERS



(57) Abstract: A device for packaging thin body containers comprises transport means, a tip-up unit (21), auxiliary guides (30), an unloading zone (58) and movement means suitable for cooperating with the tip-up unit (21) in the unloading configuration and with the auxiliary guides in the active configuration, to move the containers towards the unloading area (58).

**DESCRIPTION****"Device and method for packaging of thin body containers,  
and loading group of said containers"**

[0001] The present invention relates to a device and method  
5 for packaging thin wall containers, in particular  
flexible containers, such as those for containing dense  
fluids such as creams, yoghurt, honey, fruit juices,  
medicines and the like.

[0002] It is known that for technological reasons,  
10 containers, especially for use with foodstuffs, are  
manufactured by a first company and then packaged and  
transported to the company producing the dense fluid,  
where they are filled and sealed.

[0003] The logistic costs of the containers significantly  
15 influence the overall cost of supplying the product.

[0004] The purpose of the present invention is to realise a  
device and method for packaging thin body containers,  
which significantly reduces transport costs.

[0005] Such purpose is achieved by a device according to  
20 claim 1. Such purpose is further achieved by a packaging  
method according to claim 12. The purpose is further  
achieved by a loading group of the containers according  
to claim 13.

[0006] The characteristics and advantages of the invention  
25 will be evident from the description given below, made by

way of a non-limiting example, according to the appended drawings, wherein:

[0007] - figure 1 shows a ground view diagram of a production and packaging apparatus of thin body  
5 containers;

[0008] - figures 2a to 2e show a functioning sequence of a packaging device of the apparatus in figure 1;

[0009] - figure 3 shows a detail of the packaging device, and in particular a diagram of a loading unit of a chain,  
10 of a lower pusher and of tracks in the loading configuration;

[0010] - figure 4 shows a further detail of the packaging device, and in particular a diagram of the loading unit of the chain, of the lower pusher and of auxiliary guides  
15 in the position of the active configuration ; and

[0011] - figure 5 shows a loading group according to the present invention.

[0012] In accordance with the appended drawings, reference numeral 1 globally denotes a production and packaging  
20 apparatus of thin wall containers.

[0013] In particular, the apparatus is suitable to produce and package containers C consisting of a body B formed of two more walls of flexible film, facing one another and joined, for example welded along the edges, if required  
25 with gusset bags, and provided with a straw A in rigid

material, fitted in a section of the edge of the body B, usually between the side walls. Sometimes, the straw A is coupled to a cap D, also in rigid material.

[0014] One embodiment example of such containers is shown  
5 in documents EP-A1-1538105 and US-D-552,483, in the Applicant's name; one embodiment example of a straw with cap is shown in the document WO-A1-2008-050361, also in the Applicant's name.

[0015] The apparatus 1 comprises a production device 2  
10 suitable to produce the containers C to be packaged; the production device 2 proffers the containers C to be packaged in a predefined arrangement.

[0016] For example, the containers C to be packaged are proffered in rows and upside-down, that is with the straw  
15 facing downwards and the flexible body facing upwards.

[0017] The apparatus 1 further comprises a packaging device suitable to package the containers C and transport means for the transport of the containers C from the production device 2 to the packaging device.

20 [0018] For example, the transport means comprise a chain 8 able to translate along a transport direction (T); the chain 8 forms a closed outward (from the production device to the packaging device) and return circuit (from the packaging device to the production device).

25 [0019] The chain 8 comprises a plurality of loading units

10 aligned along a transport direction T and preferably hinged to each other. For example, each loading unit 10 is suitable to transport one container C.

[0020] According to a preferred embodiment, the longitudinal cross-section of a loading unit 10, that is the cross-section made with a plane containing the transport direction T, is a "U" shape to permit the sliding of the containers C in an unloading direction U, orthogonal to the transport direction T.

10 [0021] According to a preferred embodiment, the loading unit 10 has a base 12, sides 14 projecting from the extremities of the base 12 and tabs 16, connected to the extremities of the sides and converging with each other so as to leave a sliding passage 18 open and define a loading compartment 20.

[0022] The container C, in the loading unit 10, is positioned vertically, that is in a vertical direction V (orthogonal to the transport direction T and to the unloading direction U). Moreover, the container C is positioned upside-down, that is with the straw A facing downwards and the body upwards.

[0023] In particular, the straw A is partially housed in the loading compartment 20; a section of the straw A traverses the passage 18 and the body B is rather positioned on the outside of the loading unit 10.

[0024] The packaging device comprises an intermediate station 19, alongside the chain 8 for the transfer of the containers from the chain to the intermediate station by pushing and sliding.

5 [0025] The intermediate station 19 comprises a tip-up unit 21 suitable to tip up the containers C to arrange them vertically upright, that is with the straw A facing upwards and the container downwards.

[0026] According to a preferred embodiment, the tip-up unit  
10 21 comprises a plurality of tracks 22, which extend mainly in the unloading direction U and are positioned side by side along a transport direction T.

[0027] The tracks 22 are distanced along the transport direction T, so as to form an interspace 23 between these  
15 to hold the straw A.

[0028] In particular, the outline of the tracks 22, that is the shape of the cross-section obtained with a plane containing the transport direction T is such as to form a bilateral vertical restraint, such that when the straw A  
20 is held between the tracks, the containers cannot be extracted vertically, either upwards or downwards.

[0029] For example, the straw comprises two vertically distanced flanges, between which the tracks 22 are inserted, preventing the movement of the container  
25 downwards and upwards.

[0030] The tip-up unit 21 is suitable to pass from a loading configuration, in which it is suitable to receive the upside-down containers C brought by the chain 8, to an unloading configuration, in which the containers are hanging and upright.

[0031] In particular, in the loading configuration, the tracks 22 are aligned with the loading units 10 of the chain 8 along the unloading direction U; in particular, the loading compartments 20 of said loading units 10 are aligned along the unloading direction U with the tip-up interspaces 23 formed between the tracks 22, so as to form a single duct along said unloading direction U.

[0032] Moreover, in the loading configuration, the tracks 22 are at a lower height so that the loading compartments 20 of said loading units 10 are level with the tip up interspaces 23 formed between the tracks 22.

[0033] In the unloading configuration, the tracks are at a greater height, that is higher, and rotated around a rotation axis R parallel to the direction of advancement of the chain 8 along the transport direction T.

[0034] Consequently, while in the loading configuration, the containers C are supported on the tracks 22, in the unloading configuration they hang from them.

[0035] Furthermore, the intermediate station 19 comprises auxiliary guides 30, also suitable to receive the

containers C.

[0036] The auxiliary guides 30 are suitable to pass from an active configuration, in which they are level with the chain 8 and aligned with it in the unloading direction U,  
5 to an inactive configuration.

[0037] Preferably, the configurations which can be assumed by the tip-up unit 21 and by the auxiliary guides 30 are reciprocally correlated, in the sense that:

[0038] -when the tip-up unit is in the loading  
10 configuration, the auxiliary guides are in the inactive configuration; and

[0039] -when the tip-up unit is in the unloading configuration, the auxiliary guides are in the active configuration.

15 [0040] In particular, the auxiliary guides 30 are replaceable in position with the tracks 22 of the tip-up unit, in the sense that when the tracks 22 leave the position assumed in the loading configuration, such position is occupied by the auxiliary guides and vice  
20 versa.

[0041] For example, in a preferred embodiment, in the inactive configuration, the auxiliary guides 30 are positioned below the tracks 22 when these are in the position of the loading configuration.

25 [0042] When the tracks 22 leave the position of the loading

configuration to adopt the position of the unloading configuration, the auxiliary guides move upwards and occupy the position previously occupied by the tracks 22 (active configuration of the auxiliary guides).

5 [0043] The packaging device further comprises movement means suitable to move a plurality of containers C from the transport means to the intermediate station 19.

[0044] According to a preferred embodiment, said movement means comprise a first series of lower pushers 42 and a  
10 second series of upper pushers 52.

[0045] The pusher elements 42, 52 are elements elongated in the unloading direction U. Moreover, the pusher elements 42, 52 are arranged in pairs; the elements 42, 52 of each pair are vertically distanced; the lower elements 42 of  
15 the pairs and upper elements 52 of said pairs are distanced from each other in the transport direction T.

[0046] According to a preferred embodiment, the lower pusher elements and the upper pusher elements are joined in movement and together make up a fork 55.

20 [0047] The first series is positioned at a lower height so that the relative pushers 42 are aligned horizontally with the loading compartments 20 of the chain 8 and with the tip-up interspaces 23 between the tracks 22 of the tip-up unit 21 in the position of the loading  
25 configuration and the auxiliary interspaces 32 between

the auxiliary guides 30 in the position of the active configuration.

[0048] The second series is positioned at a greater height, that is higher up, so that the relative pushers 52 are  
5 aligned horizontally with the tip-up interspaces 23 between the tracks 22 of the tip-up unit 21 in the position of the unloading configuration.

[0049] The movement means have an unloading movement in the direction of the unloading axis U; in particular, the  
10 first series and second series of pushers 42, 52 have an outward and return movement in the direction of the unloading axis U, between a forward position, at the limit of the outward stroke, and a retracted position, at the limit of the return stroke.

15 [0050] Moreover, at least the lower series is provided with a double stroke movement, in other words able to perform a short stroke and a long stroke, according to the step of the packaging method as described above.

[0051] The packaging device further comprises an unloading  
20 area 58, positioned alongside the intermediate station 19, on the opposite side to the chain 8.

[0052] In said unloading area 58, there is a loading box 60 suitable to receive a plurality of containers aligned in rows and columns.

25 [0053] The loading box is portable and is positioned at the

intermediate station, on the opposite side to the chain 8.

[0054] The loading box 60 comprises a lower surface 62 and an upper surface 64, distanced vertically, each made up of a succession of loading profiles 66, 68 extending  
5 mainly along the unloading direction U and positioned side by side along the transport direction T.

[0055] The profiles 66, 68 have a transversal cross-section, that is made with a plane containing the  
10 transport direction T, in a "U" shape, to form a bilateral vertical restraint.

[0056] The profiles 66 of the lower surface 62 have the aperture of the section facing upwards; the profiles 68 of the upper surface 64 have the aperture of the section  
15 facing downwards, in other words facing the aperture of the section of the lower profiles.

[0057] The lower profiles 66 are aligned with the auxiliary interspaces 32 between the auxiliary guides 30 when these are up, in the active configuration; the upper profiles  
20 68 are aligned with the tip-up interspaces 23 between the tracks 22 when these are up, in the position of the unloading configuration.

[0058] A packaging method which can be performed using the packaging device described above comprises a first step  
25 of loading upright containers, a second step of loading

upside-down containers and a third step of unloading.

[0059] In an initial configuration of the packaging device, the tip-up unit 21 is in the loading configuration, that is the tracks 22 are down, level with the chain.

5 [0060] The auxiliary guides 30 are in the inactive configuration, that is below the tracks 22.

[0061] The lower and upper pushers 42, 52 are in the rearward position.

[0062] The loading box is alongside the intermediate  
10 station so that the lower profiles 66 are level with the chain 8 and the upper profiles 68 level with the tracks 22 in the unloading configuration.

[0063] In the first loading step (loading of upright containers), the production device 2, which has produced  
15 a plurality of containers C, arranges a predefined number, such as thirteen or fifteen, on the chain 8, one for each loading unit 10, so that the straws occupy the respective loading compartment 20 of the loading unit 10. Said group of containers is called a "train".

20 [0064] The body B of the containers C is aligned along the transport axis T.

[0065] The chain 8 is moved so as to move along a transport axis T. The train of containers C is transported by the production device 2 to the packaging device.

25 [0066] The chain 8 stops so that the loading compartments

20 occupied by the train of containers C are aligned with the tip-up interspaces 23 between the tracks 22, below.

[0067] The movement means are driven to move the containers C from the chain 8 to the intermediate area 19 in particular in the tip-up interspaces 23 between the tracks 22.

[0068] In particular, the pushers 42 are driven and brought from the rearward position to the forward position moving along the unloading axis U, so that the containers are pushed by the loading units 10 of the chain 8 to the tip-up interspaces 23 between the tracks 22.

[0069] The pushers 42 move by a short stroke and return to the rearward position.

[0070] The tip-up unit 21 tips the train of containers arranged in the tip-up interspaces 23 between the tracks 22.

[0071] In particular, the tracks 22 simultaneously perform a vertical movement upwards and rotating around the rotation axis R, overturning the train of containers C.

[0072] When the tracks 22 leave the position of the loading configuration, the auxiliary guides 30 take their place, moving into the position of the active configuration.

[0073] The tracks 22 position themselves in the unloading configuration, in which they are higher up than the previous height, preferably still in the intermediate

station 19, aligned with the upper pushers 52.

[0074] An intermediate configuration of the device is thus defined, wherein the tip-up unit 21 is in the unloading configuration, that is the tracks 22 are up, at the level  
5 of the upper pushers 52.

[0075] The auxiliary guides 30 are in the active configuration, so that the tip-up interspaces between them are aligned horizontally with the chain and with the lower pushers 42.

10 [0076] The pushers 42, 52 are in the rearward position.

[0077] In a second loading step (loading of upside-down containers), the production device 2, which has produced a plurality of containers C, arranges a predefined number of these on the chain 8, one for each loading unit 10, so  
15 that the straws A occupy the respective loading compartment 20 of the loading unit 10.

[0078] The body B of the containers C is aligned along the transport axis T.

[0079] The chain 8 is moved so as to move along a transport  
20 axis T. The train of containers C is transported by the production device 2 to the packaging device.

[0080] The chain 8 stops so that the loading compartments  
20 occupied by the train of containers C are aligned with the auxiliary interspaces 32 between the auxiliary guides  
25 30.

[0081] The movement means are driven to move the containers C from the chain 8 to the loading box 60, passing between the auxiliary guides 30, and contemporarily to drive the containers C hanging from the tracks 22 to the loading  
5 box 60.

[0082] In particular, the lower pushers 42 and upper pushers 52 are driven and brought from the rearward position to the forward position, moving along the unloading axis U by a long stroke, so that the containers  
10 C upside-down on the chain and the containers hanging from the tracks are pushed into the loading box 60.

[0083] The profiles 66 of the lower surface 62 of the loading box 60 receive the upside-down containers, coming from the chain, and the profiles 68 of the upper surface  
15 64 receive the hanging containers, coming from the tracks.

[0084] After pushing the containers into the loading box 60, the pushers 42, 52 return to the rearward position.

[0085] The tip-up unit 21 returns to the load  
20 configuration, that is the tracks 22 return level with the chain and the auxiliary guides return to the inactive configuration, below the tracks.

[0086] The packaging method then recommences from the first loading step, until the loading box is full.

25 [0087] Once the loading box has been filled, the full box

is replaced with an empty box.

[0088] Preferably, the full box is then inserted in a rigid casing; the casing and box unit is tipped and wrapped in a protective sheet, such as polyethylene; preferably, the casing box and wrapped sheet is inserted in a box, such as cardboard box; the rigid casing is then extracted from the cardboard box, which is in turn closed and addressed for shipment.

[0089] The present invention fully achieves the predefined aim in an innovative manner, in that it makes it possible to considerably increase the number of containers which can be transported per unit of volume.

[0090] In particular, the present invention achieves the advantage of packing into a cardboard box almost double the number of containers compared to the prior art.

[0091] It is clear that a person skilled in the art may make modifications to the apparatus and method described above so as to satisfy contingent requirements all contained within the sphere of protection as defined by the appended claims.

**Claims**

1. Device for packing slim-bodied containers, comprising:
- transport means suitable for transporting a train of containers (C) in a first arrangement, e.g., upside down;
  - 5 - a tip-up unit (21) having tip-up interspaces (23), suitable, in a load configuration, for accommodating in said tip-up interspaces the train of containers in the first arrangement and overturning it in a second arrangement, e.g., standing up, moving to an unloading
  - 10 configuration;
  - auxiliary guides (30) having auxiliary interspaces (32), suitable for accommodating, in an active configuration, a further train of containers in the first arrangement, said auxiliary interspaces being aligned
  - 15 with the respective tip-up interspaces along an unloading direction (U);
  - an unloading area (58) for accumulating the containers in rows;
  - movement means suitable for cooperating with the tip-up
  - 20 unit (21) in the unloading configuration and with the auxiliary guides in the active configuration to move the containers towards the unloading area (58), moving along said unloading direction(U).
2. Device according to the claim 1, wherein the auxiliary
- 25 guides are replaceable in position with the tip-up unit

when this switches from the loading configuration to the unloading configuration.

3. Device according to the claim 1 or 2, wherein the tip-up unit (21) comprises a plurality of tracks (22) elongated in the unloading direction (U) and distanced in a direction at right angles to the unloading direction (U), between said tracks being defined said tip-up interspaces (23), said tracks having a cross section such as to realise a bilateral vertical restraint for a straw (A) of the container fitted in the interspace (23).

4. Device according to any one of the previous claims, wherein the tip-up unit (21) is suitable for vertically moving and turning around a rotation axis (R) at right angles to the unloading direction (U) to tip up the containers.

5. Device according to any of the previous claims, wherein the transport means comprise a chain (8) suitable for moving forwards along a transport direction (T) at right angles to the unloading direction (U).

6. Device according to the claim 5, wherein the chain (8) consists of a plurality of loading units (10) each having a loading compartment (20) that can be aligned with the respective tip-up interspace (23) and auxiliary interspace (32) along the unloading direction (U).

7. Device according to any one of the preceding claims,

wherein the movement means comprise a first series (40) of pushers (42) at the level of the auxiliary interspaces (32) in the position of the active configuration of the auxiliary guides (30) and a second series (50) of pushers (52) at the level of the tip-up interspaces (23) in the position of the unloading configuration of the tip-up unit (30).

8. Device according to the claim 7, wherein the movement means are suitable for moving with double stroke.

9. Apparatus comprising:

- a packing device made according to any one of the preceding claims; and
- a loading casing (60) that can be housed in the unloading area (58) and is portable.

10. Apparatus according to the claim 9, wherein the loading casing (60) comprises a lower surface (62) and an upper surface (64), vertically distanced, each made up of a succession of loading profiles (66,68) extending along the unloading direction (U) and positioned side by side along the direction at right angles to this.

11. Method for packing slim-bodied containers that can be performed by means of a device made according to any one of the claims from 1 to 9.

12. Method for packing slim-bodied containers comprising:

- a first phase of loading containers in a second

arrangement, wherein:

- a) a chain (8) containing containers (C) in a first arrangement, contained in loading compartments (20), is moved so as to move along a transport axis (T);
- 5 b) the chain (8) stops so the loading compartments (20) occupied by the containers (C) are aligned with tip-up interspaces (23) between tracks (22) of a tip-up unit (21);
- c) movement means are driven to move the containers (C)  
10 from the chain (8) into the tip-up interspaces (23);
- d) the tip-up unit (21) overturns the train of containers (C) arranged in the tip-up interspaces (23) in a second arrangement, aligning the tip-up interspaces with an upper surface of a loading box (8);
- 15 e) auxiliary guides (30) take the place of the tip-up unit (21) at the level of the chain (8);
  - a second loading phase of further containers in the first arrangement, wherein:
- f) the chain (8) is moved to convey further containers  
20 (C) in the first arrangement;
- g) the chain (8) stops so the loading compartments (20) occupied by the containers (C) are aligned with the auxiliary interspaces (32) between the auxiliary guides (30);
- 25 h) the movement means are driven to move the containers

(C) in the first arrangement from the chain (8) to an unloading area (58) and the containers (C) in the second arrangement from the tip-up unit (21) to the unloading area.

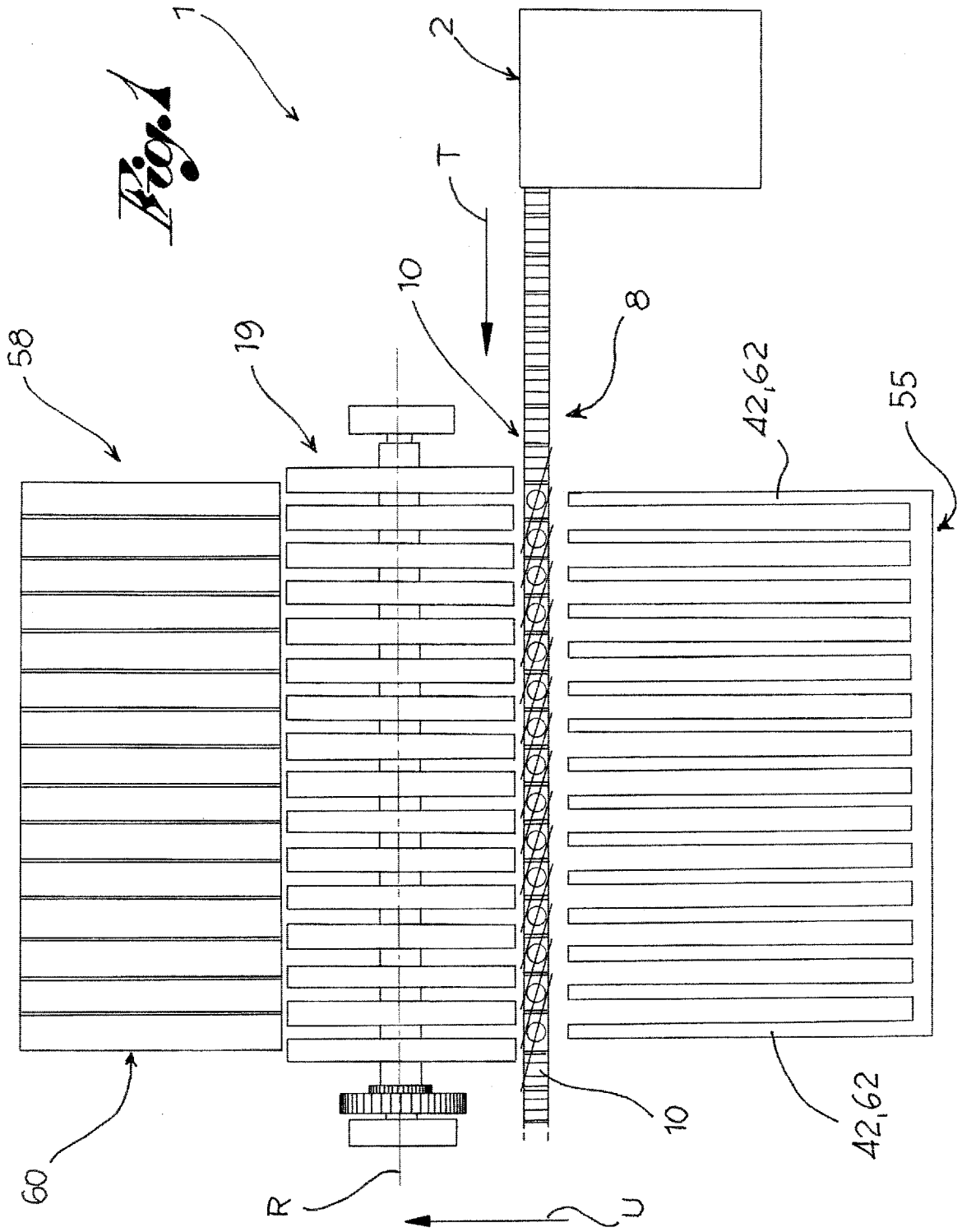
5 13. Loading assembly comprising:

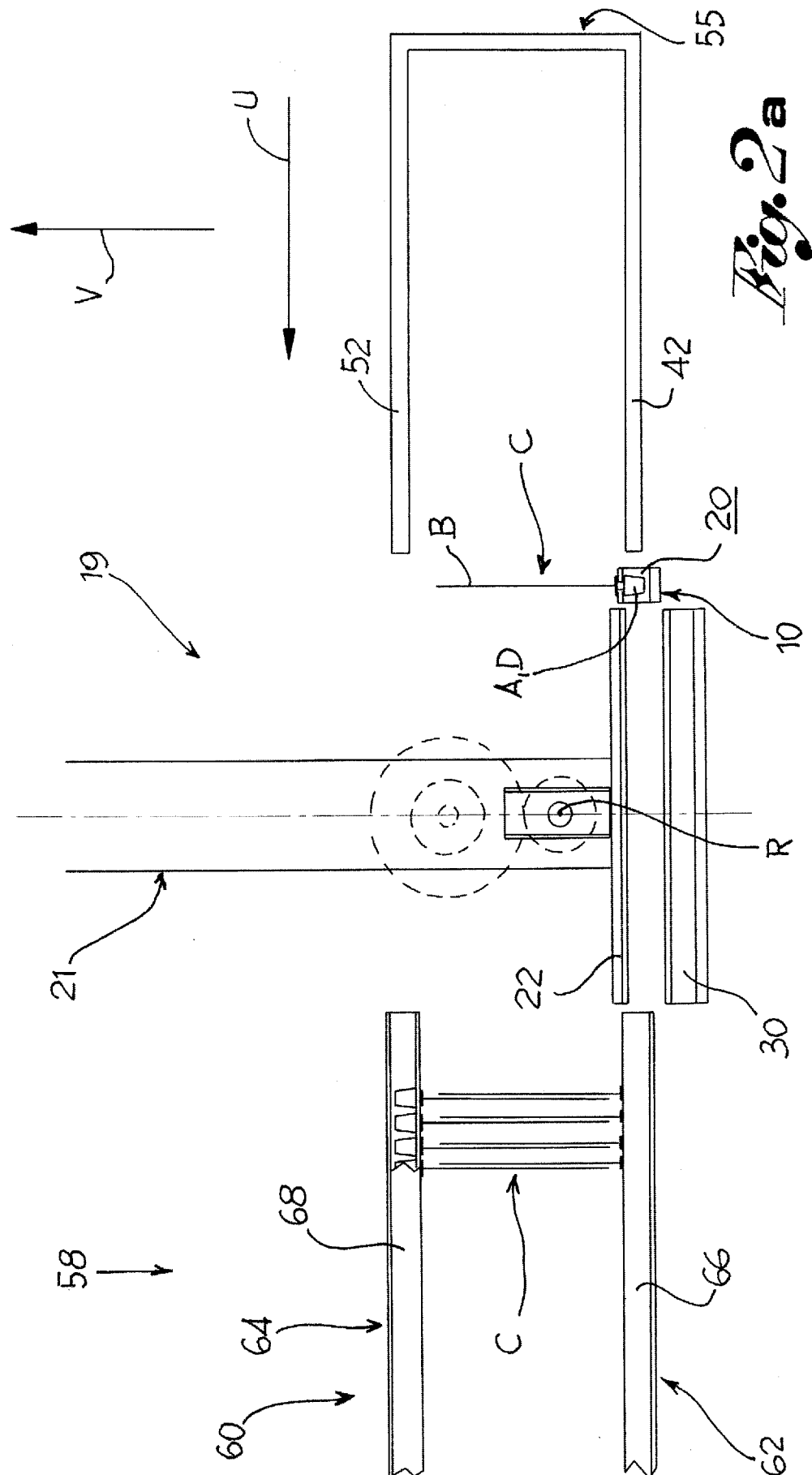
- a plurality of containers (C), each container being made up of a body (B) comprising walls of flexible film, facing one another and joined along the edges, and of a straw (A) in rigid material, fitted in a section of the  
10 edge of the body (B), between said side walls;

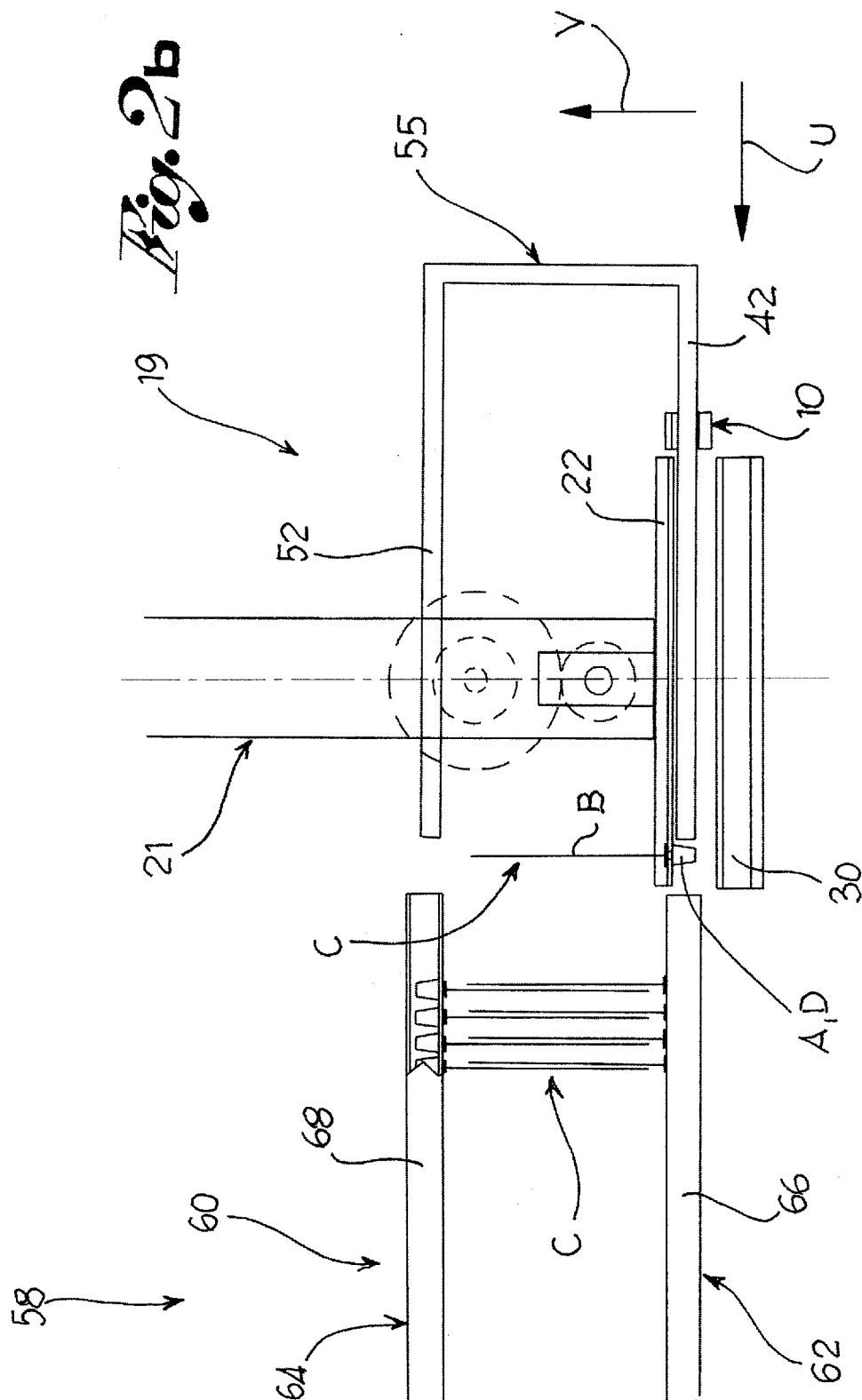
- a loading box (60) comprising a lower surface (62) and an upper surface (64), distanced along a vertical direction (V), each made up of a succession of loading profiles (66,68) prevalently extending along an unloading  
15 direction (U) and positioned side by side along a transport direction (T);

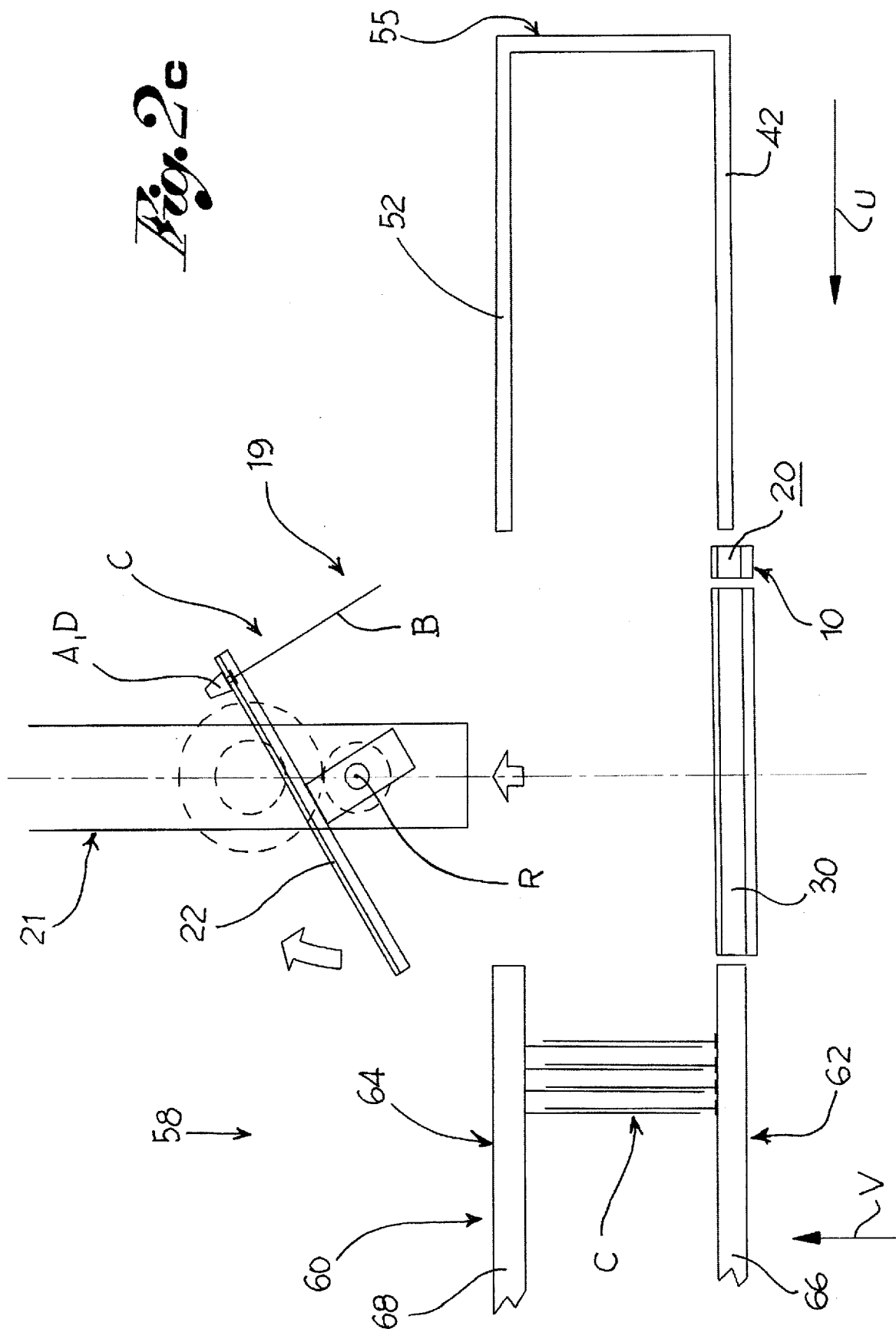
wherein the containers (C) succeed one another forming rows along the transport direction (T) and forming columns along the unloading direction (U);

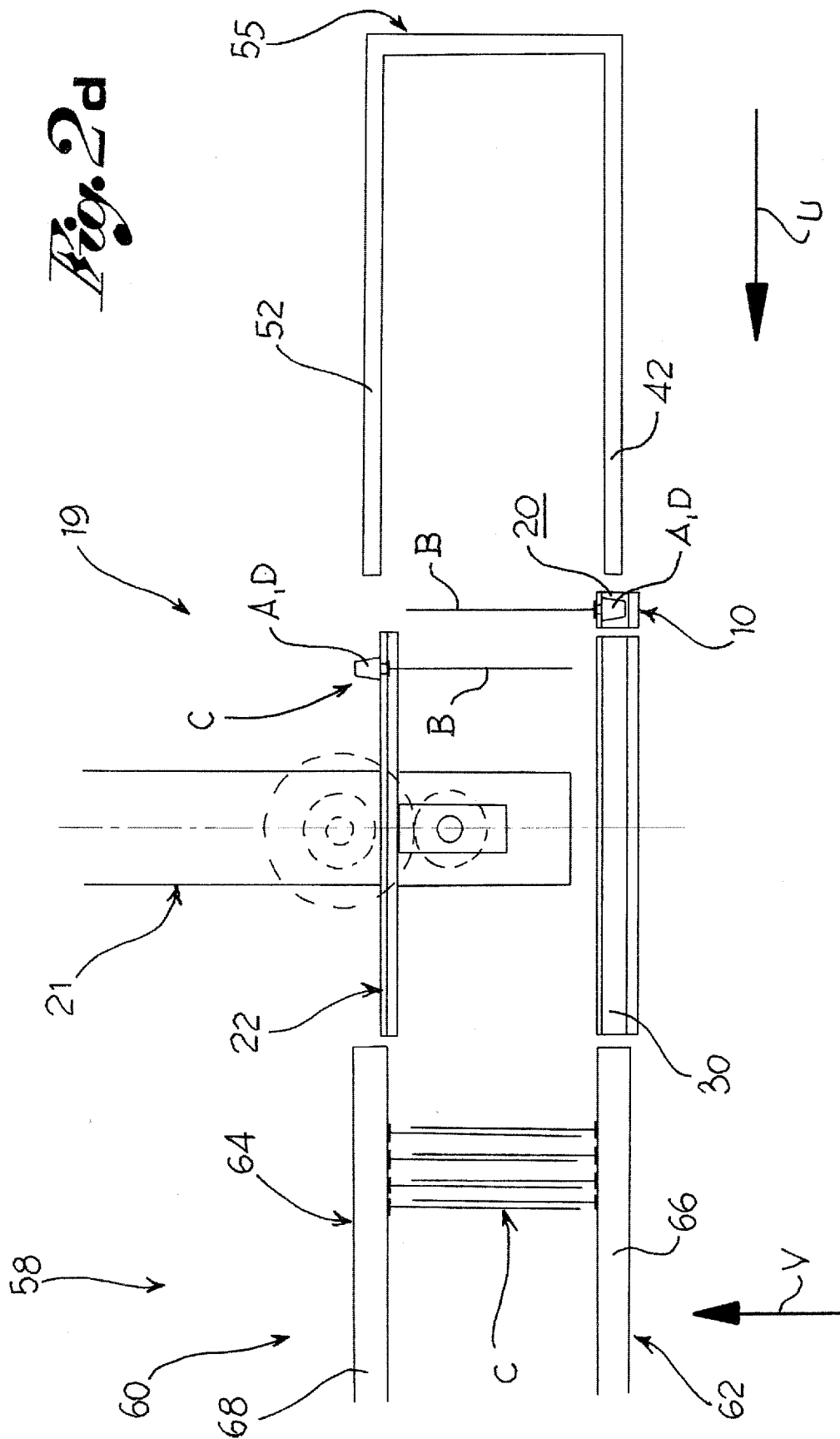
20 and wherein, along the unloading direction (U), one row of containers (C) resting on the lower surface (62) is succeeded by a further row of containers (C) hanging on the upper surface (64).

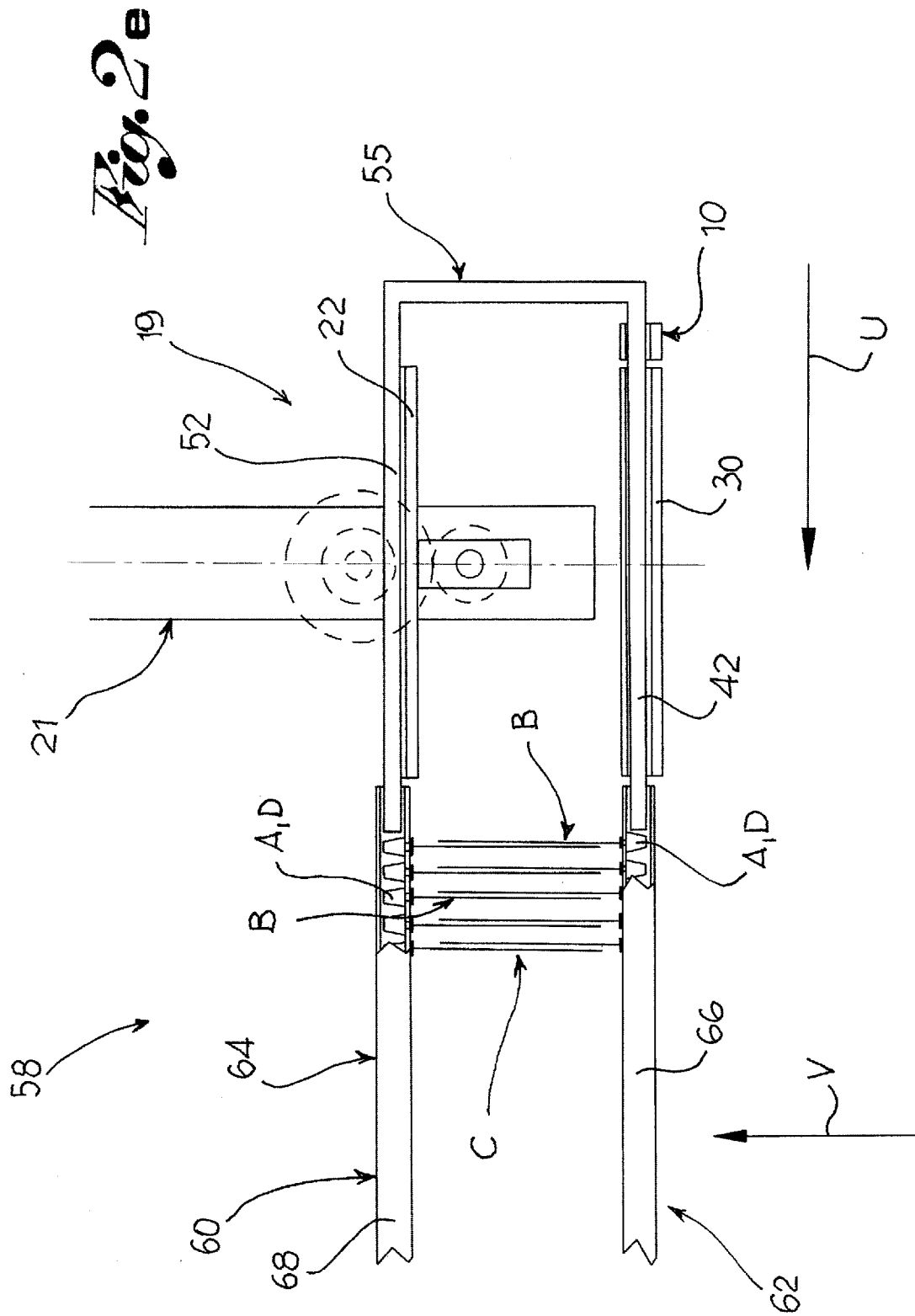


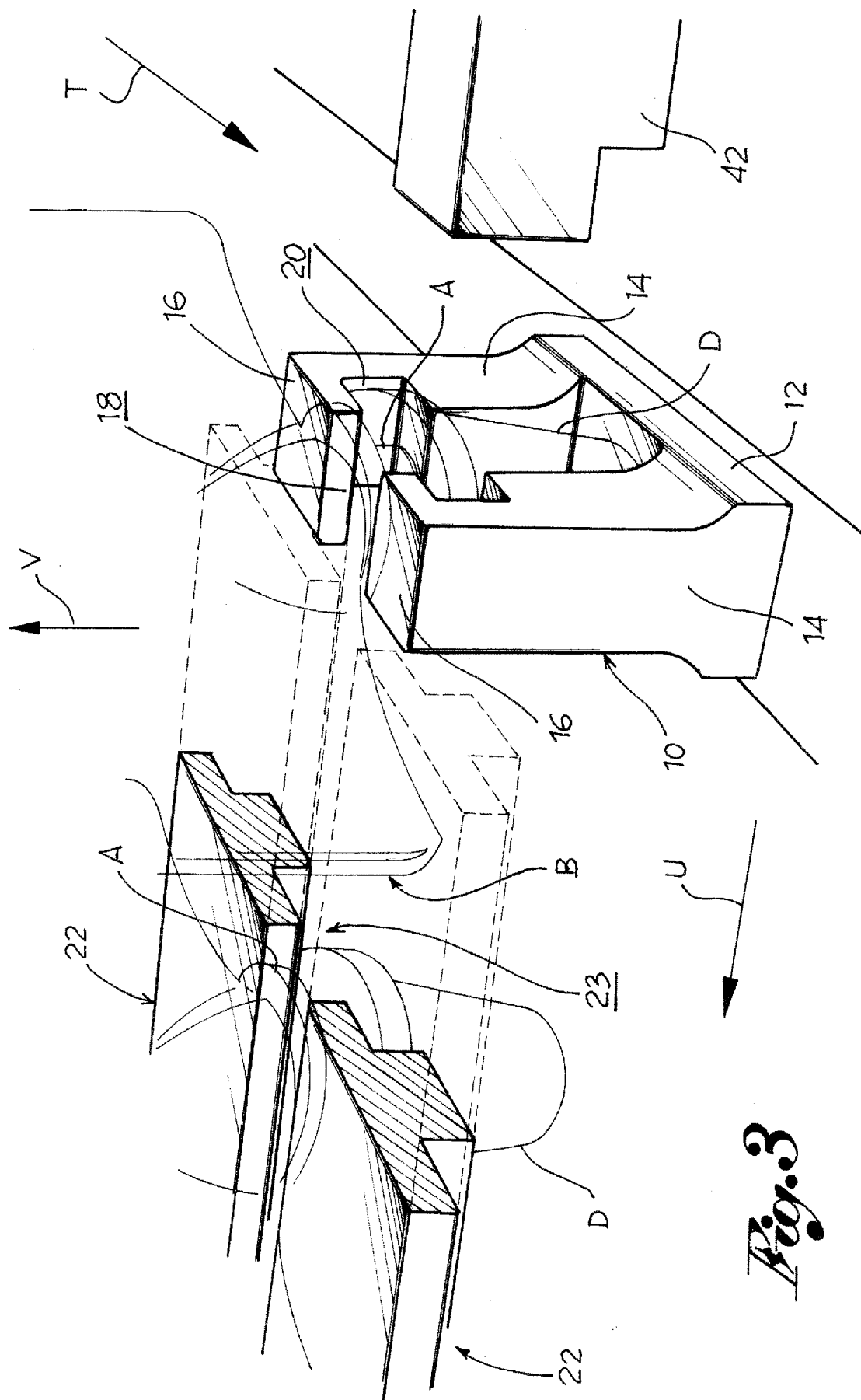






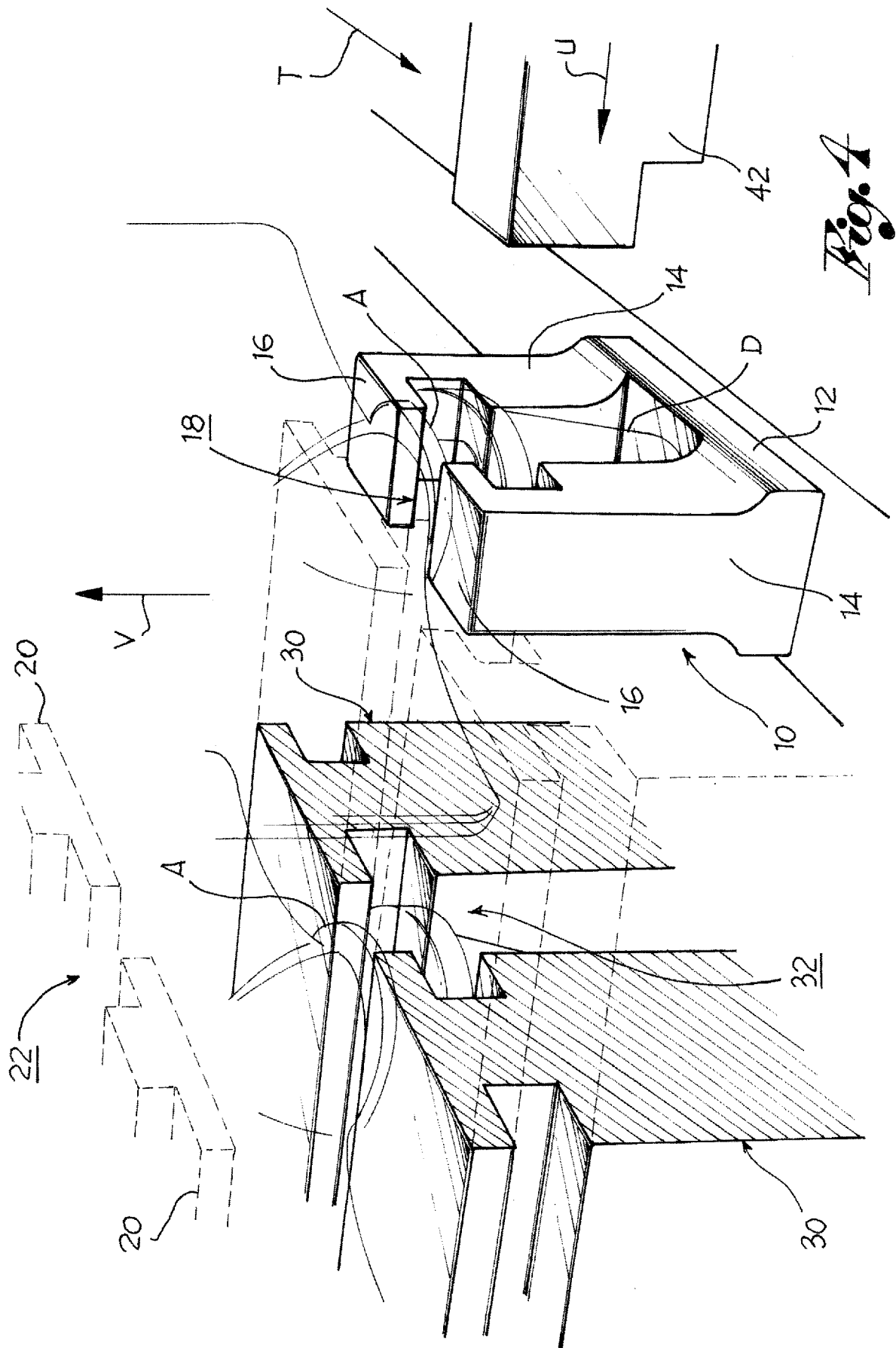


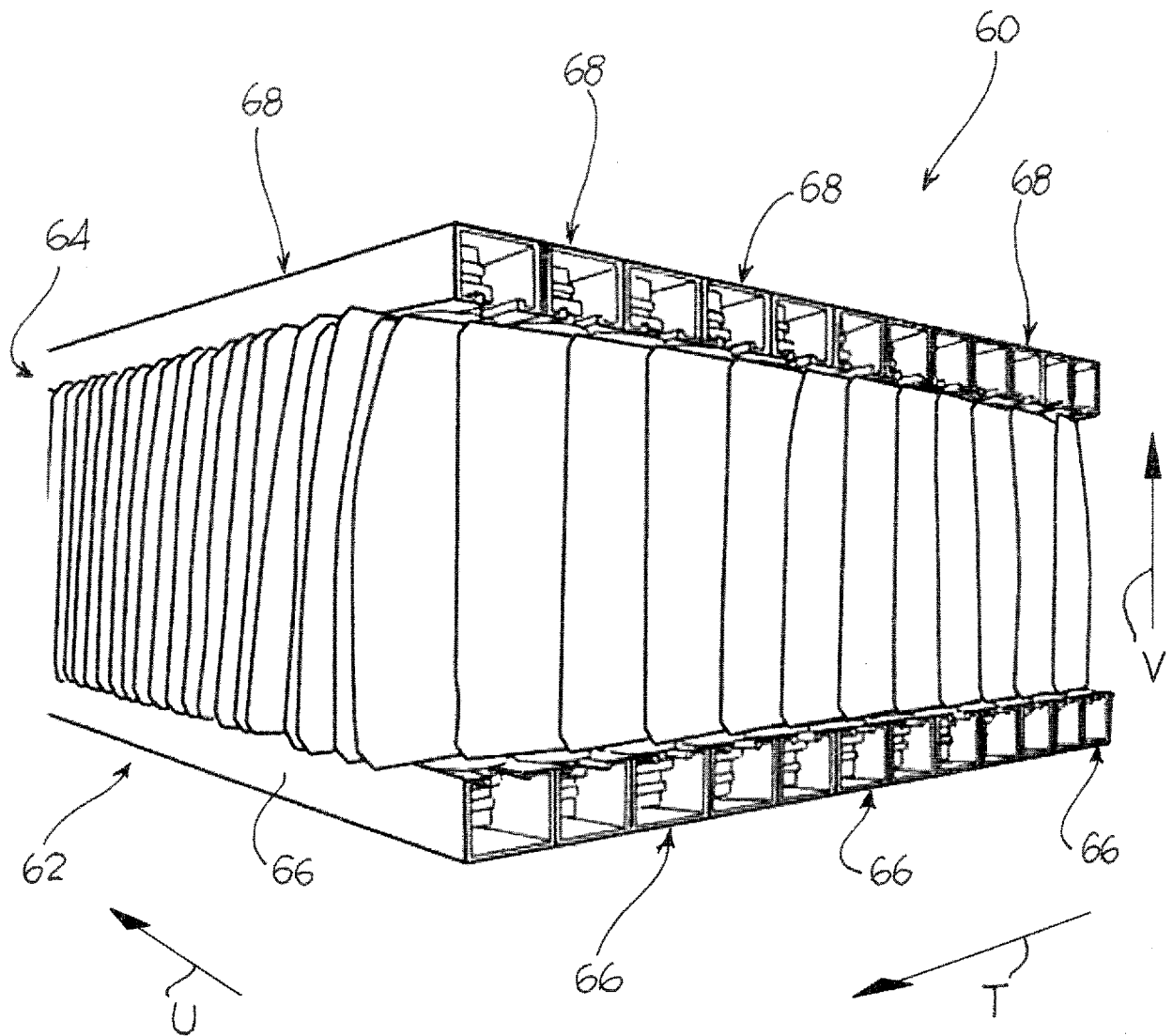




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*Fig. 5*

# INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2011/053501

## A. CLASSIFICATION OF SUBJECT MATTER

INV. B65D5/50 B65B5/10 B65B35/58  
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                      | Relevant to claim No. |
|-----------|---------------------------------------------------------------------------------------------------------|-----------------------|
| A         | JP 5 170252 A (TOYO SEIKAN KAISHA LTD)<br>9 July 1993 (1993-07-09)<br>abstract; figures 8,9<br>-----    | 1,9,<br>11-13         |
| A         | EP 1 201 546 A1 (TOYO JIDOKI KK [JP])<br>2 May 2002 (2002-05-02)<br>paragraph [0038]; figure 6<br>----- | 1,9,<br>11-13         |

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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